

C L A I M S

1. Energy line guide chain for running lines
5 between a stationary and a movable connection, with
jointed chain links (1,21,37) of plastic, which define
each a channel section (8,28,60) extending in the
direction of the energy line guide chain (12;35), each
chain link (1;21) comprising two opposite link plates
10 (2,3;22,23;38,39) extending in spaced relationship in a
longitudinal direction of the energy line guide chain
(12;35), which link plates are interconnected by at least
one crosspiece (4,5;24,25;40,41) each link plate
15 (2,3;22,23;38,39) comprising a joint body (6,26,42) and a
joint receiver (7,27,46), which extend substantially
crosswise to the longitudinal direction of the energy
line guide chain (12,35) with a joint body (6,26,42) of
a chain link engaging a joint receiver (7,27,46) of an
opposite link plate (2,3;22,23;38,39), characterized in
20 that a clearance (20) is provided respectively between
the partially overlapping link plates (2,3;22,23;38,39)
of two adjacent chain links (1,21,37), and that the joint
body (6,26,42) comprises two diametrically opposite outer
surface areas (18) and the joint receiver (7,27,46) two
25 diametrically opposite inner surface areas (19), and only
the outer surface areas (18) and inner surface areas (19)
lie against each other.

2. Energy line guide chain of claim 1,
30 characterized in that the normal lines of the outer
surface areas (18) and inner surface areas (19) extend
substantially perpendicularly to the longitudinal
direction of the energy line guide chain (12,35).

Claim 3
3. Energy line guide chain of claim 1 or 2, characterized in that the joint body (6,26,42) is made substantially cylindrical, and the joint receiver (7,27,42) has a substantially oval cross section.

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4. Energy line guide chain of claim 1 or 2, characterized in that the joint body (6,26,42) has a substantially oval cross section and the joint receiver (7,27,46) a circular cross section.

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5. Energy line guide chain of one of claims 1-4, characterized in that two adjacent chain links (1,21,37) are adapted for pivoting relative to each other over a sector angle up to about 45°.

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6. Energy line guide chain of one of claims 1-5, characterized in that the joint body (42) is formed by joint body segments (43), which are separated from one another by slots (44).

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7. Energy line guide chain of one of claims 1-6, characterized in that the joint body (42) comprises in the region of its free end portion a radially outward directed collar (45).

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8. Energy line guide chain of claim 7, characterized in that a cavity (47) is provided in concentric relationship with a joint receiver (46), into which the collar (45) extends with a play.

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Claim 9
9. Energy line guide chain of one of claims 1-8, characterized in that the crosspiece (4,24)

comprises a convexly curved portion (9,29), which lies in a plane extending substantially crosswise to the link plate (2,22) and engages an opposite portion (10,30) made to correspond with the convexly curved portion (9,29),
5 the portion (9,29) of the crosspiece (4,24) of a chain link (1,21) engaging the portion (10,30) of the crosspiece (4,24) of an adjacent chain link (1,21).

10. Energy line guide chain of claim 9,
10 characterized in that the convexly curved portion (29) is formed in a free end region of an extension (32) extending in the longitudinal direction of the energy line guide chain, and that the crosspiece (24) comprises a cutout (33), which merges into the portion (30), with
15 the cutout (33) narrowing from an end face (34) of the crosspiece (24) in the direction of the portion (30).

Subpt B) 11. Energy line guide chain of claim 9 or 10,
20 characterized in that at least the portion (9,29) and the portion (10,30) are made symmetrical with respect to an axis (11;31) extending substantially parallel to the longitudinal axis of the energy line guide chain.

12. Energy line guide chain of one of claims
25 1-11, characterized in that two adjacent chain links (1;21) comprise two spaced-apart outer joint axes (13), that the adjacent chain links (1;21) comprise crosspieces (4;24), whose overall extension between the joint axes (13) is greater than the spacing between the outer joint axes (13).
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13. Energy line guide chain of one of claims 1-12, characterized in that at least two adjacent chain

links (1;21) comprise two opposite crosspieces (5;25) extending in spaced relationship crosswise to the longitudinal direction of the energy line guide chain (12;35), wherein in a stretched state of the energy line guide chain (12;35), the crosspieces (5;25) of the adjacent chain links (1;21) extending in a common plane are spaced from one another, and wherein these crosspieces (5;25) adjoin one another in a curved region.

10 14. Energy line guide chain of one of claims 1-13, characterized in that a crosspiece (40) is adapted for detachably connecting with its one end to a link plate (38), and that it connects to the other link plate (39) by means of a film hinge (48).

15 15. Energy line guide chain of claim 14, characterized in that in the region of the film hinge (48), the crosspiece (40) comprises at least one projection (53), so that in a closed position of the crosspiece (40), the projection (53) lies on an edge of the link plate (39).

20 16. Energy line guide chain of claim 14 or 15, characterized in that the crosspiece (40) forms a cover.

25 17. Energy line guide chain of one of claims 1-16, characterized in that at least one link plate (38,39) comprises at its one end a stop element (61) and at its other end a stop surface (62), the stop surface (62) being designed and constructed substantially parallel to a center plane of the link plate (38,39).

30 18. Energy line guide chain for running lines between a stationary and a movable connection, with

jointed chain links (1,21,37) of plastic, in particular in accordance with one of claims 1-16, the guide chain comprising at least one connecting link (63), characterized in that the at least one connecting link (63) comprises a base body (64) with at least one receptacle (68), which is adapted for receiving a connection element mounted to a connection point, and a locking element (80) cooperating with the base body (64), which is used to secure the connection element to the base body (64).

19. Energy line guide chain of claim 18, characterized in that the receptacle (68) is defined by a wall (69), which is molded to a bottom wall (70) and made at least in part spring-elastic, and that the wall (69) forms with the connection element a snap connection.

20. Energy line guide chain of claim 19, characterized in that the wall (69) is formed by at least two wall segments (71,73), which are separated from one another by slots (72).

21. Energy line guide chain of claim 20, characterized in that four wall segments (71,73) are provided, with two opposite wall segments (73) being made substantially rigid, and the two further opposite wall segments (71) being made substantially spring-elastic.

Sub A5
30 22. Energy line guide chain of claim 19, 20, or 21, characterized in that the locking element (80) is displaceably connected to the base body (64), so that in a locking position, the locking element (80) impedes at least the deflection capability of the wall (69), and facilitates it in another position.

23. Energy line guide chain of claim 22,
characterized in that the locking element (80) is made
substantially U-shaped, with its free legs (81,82)
5 partially abutting in a locking position the wall (69),
in particular the elastic wall segments (71).

24. Energy line guide chain of claim 23,
characterized in that the base body (64) comprises a
10 slide-in opening (74), in which the locking element (80)
is held for displacement, with the free legs (81,82)
thereof partially abutting in the locking position the
wall (69), in particular the elastic wall segments (71),
and the lateral surfaces (77) of the slide-in opening
15 (74).

25. Energy line guide chain of claim 24,
characterized in that the locking element (80) comprises
a safety flap (85), which is spaced from the legs (81,82)
20 and made substantially parallel to same, the locking
element (80) being adapted for moving to the locking
position only when the safety flap (85) is released by
the connection element.

26. Energy line guide chain of claim 25,
characterized in that the base body (64) comprises a
projection (88), which extends into the plane of movement
of the safety flap (85), that the safety flap (85) has an
opening (86), which engages the projection (88) in the
30 locking position, the safety flap (85) being adapted for
deflection by the connection element such that same can
be moved to the locking position.

27. Energy line guide chain of claim 26,
characterized in that the projection (88) and the opening
(86) have such a shape, ~~that~~ no automatic release of the
locking engagement occurs.

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Sub A/B 28. Energy line guide chain of one of claims
18-27, characterized that the receptacle (68) fully
extends through the base body (64).

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29. Energy line guide chain of one of claims
18-28, characterized in that the receptacle (68) and the
connection element are designed and constructed
rotationally symmetric.

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